CLAIMS

1. Thermoplastic copolyamide ~~characterized in that it is the result of~~ resulting from the reaction between at least one monofunctional monomer satisfying the following general formula I:

$$(AR_1)\text{-}R\text{-}(R_2B)_n \qquad (I)$$

in which:

- n is an integer greater than or equal to 2, ~~preferably between 2 and 10 (limits inclusive),~~
- R_1, R_2 may be identical or different and represent a covalent bond or an aliphatic, arylaliphatic, aromatic or alkylaromatic hydrocarbon radical,
- R is a linear or branched aliphatic radical, a substituted or unsubstituted cycloaliphatic radical, a substituted or unsubstituted aromatic radical possibly comprising several aromatic rings and/or hetero atoms, or a polymeric chain possibly containing hetero atoms,
- A represents the amine or amine salt functional group, or the acid, ester, acid halide or amide functional group,

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- B represents the amine or amine salt functional group when A represents an acid, ester, acid halide or amide functional group, and an acid, ester, acid halide or amide functional group when A represents an amine or amine salt functional group,

and at least one of the difunctional monomers of the following formulae II to IV with, optionally, some of the monofunctional monomers of the following formulae V or VI, or with a prepolymer obtained from at least one difunctional monomer of the following formulae II to IV and, optionally, at least one monofunctional monomer of the following formulae V or VI,

- the difunctional monomers satisfying the following general formulae:

A_1-R_3-A_1 (II)

B_1-R_4-B_1 (III) and/or

A_1-R_5-B_1 or the corresponding lactams (IV)

- the monofunctional monomers satisfying the following general formulae:

R_6-B_1 (V) and/or

R_7-A_1 (VI)

in which

Sub B2

- A_1, B_1 represent, respectively, an acid, ester or acid chloride functional group and an amine functional group or an amine salt,
- R_3, R_4, R_5, R_6, R_7 represent substituted or unsubstituted, aromatic, linear or branched, alkyl hydrocarbon radicals or alkylaryl, arylalkyl or cycloaliphatic radicals possibly including unsaturated groups.

2. Copolyamide according to Claim 1, ~~characterized in that~~ wherein the radical R is an aromatic radical.

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3. Copolyamide according to Claim 1 ~~or 2~~, ~~characterized in that~~ wherein the molar ratio of the multifunctional monomers of formula I to the sum of the difunctional monomers of formulae II, III, IV and monofunctional monomers of formulae V and VI is between 0.01 % and 5 %, ~~preferably between 0.05 % and 1 %~~.

4. Copolyamide according to ~~one of Claims 1 to 3~~, Claim 1 ~~characterized in that~~ wherein the monomer of formula I is a compound in which A represents the amine functional group, B represents the acid functional group, n is equal to 2, R represents an aromatic radical and R_1 and R_2 represent a covalent bond.

5. Copolyamide according to ~~one of Claims 1 to 4~~, Claim 1 ~~characterized in that~~ wherein the monomer of formula I is 5-aminoisophthalic acid.

6. Copolyamide according to ~~one of Claims 1 to 3, characterized in that~~ Claim 1 wherein the monomer of formula I is 6-aminoundecanedioic acid.

7. Copolyamide according to ~~one of the preceding claims, characterized in that it has~~ Claim 1 having a melt flow index (MFI) of less than 5 g/10 minutes (measured at 275°C under a load of 2160 g).

8. Copolyamide according to ~~one of the preceding claims, characterized in that it has~~ Claim 1 having a molecular-mass distribution index D of greater than 2.

9. Process for manufacturing a copolyamide according to ~~one of the preceding claims, characterized in that it consists~~ Claim 1 comprising in adding, into the reaction mass containing difunctional monomers of formulae II to IV and, optionally, monofunctional monomers of formula V or VI, leading to a linear polyamide, a predetermined amount of a multifunctional monomer of formula I and then in carrying out the polycondensation under the temperature and pressure conditions used for the polymerization of the said linear polyamide.

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10. Process for manufacturing a copolyamide according to ~~one of Claims 1 to 8, characterized in that it consists~~ Claim 1 comprising in synthesizing a prepolymer of a linear polyamide from one or more monomers of formulae II to IV and, optionally, monofunctional monomers of formula V or VI, in adding, to this said prepolymer in the solid state or in the melt, a predetermined amount

of polyfunctional monomer and then ~~in~~ making ~~the~~ said polyfunctional monomer react with ~~the~~ said prepolymer either in the solid state or in the melt.

11. Process according to Claim 10, ~~characterized in that~~ wherein an amidification or polycondensation catalyst is added with the polyfunctional monomer.

12. Composition comprising, as matrix, at least one copolyamide according to ~~one of Claims 1 to 8~~ Claim 1 and other components chosen from the group comprising reinforcing fillers, filling fillers, antioxidants, stabilizers, pigments, colorants, fire retardants and moulding aids.

Add A1